

ABSTRACT

5 The present invention includes a horizontal foam fractionation protein skimmer for removing organic waste material (dissolved organic compounds) from organic loaded water. The protein skimmer includes a horizontal reaction chamber connected to a foam collection chamber in which protein-loaded foam containing organic waste material is collected. The reaction chamber is comprised of a series of horizontally-directed, nested, concentric tubes
10 for increasing the number and decreasing the size of bubbles to facilitate efficient removal of dissolved organic compounds. Each horizontal tube has either one or several small openings that are offset from the openings on the adjacent tube at a small angle, typically 10°. The openings are formed by either a single slit that runs along the length of each tube, or by a series of holes that runs along the length of each tube. Organic-loaded water is pumped
15 through tubing into the reaction chamber. As water moves through the tubing, gas (e.g., air) is drawn in by eductors, creating a gas/water mixture. The gas/water mixture is distributed into the horizontal reaction chamber through a lateral manifold that tangentially injects the gas/water mixture at approximately equidistant points along the length of the reaction chamber. The gas/water mixture enters the largest of the nested horizontal tubes and is forced
20 through the small opening(s) into the next smaller diameter tube.

Water travels circumferentially through adjacent tubes in a counter-current movement. The most central concentric tube carries the water out of the reaction chamber into the foam collection chamber. The water left behind is considerably more pure and free of contaminants
25 and exits through tubing in the bottom of the foam collection chamber. The horizontal protein skimmer of the present invention is sectioned into individual components that facilitate transport and on-site assembly.